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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,608	02/11/2004	Heinrich Ollendorf	2003P54807US (BHGL 10808/	4629
757	7590	10/03/2005	EXAMINER	
BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, IL 60610			GURLEY, LYNNE ANN	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

10/777,608

Applicant(s)

OLLENDORF ET AL.

Examiner

Lynne A. Gurley

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 February 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

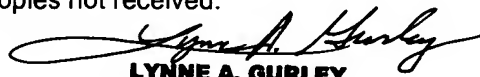
**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**LYNNE A. GURLEY**  
**PRIMARY PATENT EXAMINER**  
**TC 2800, AU 2812**

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/20/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on 8/20/04 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Specification***

2. The disclosure is objected to because of the following informalities: On page 4, line 21, "results" should be "result". On page 5, "fluor" should be "fluorine" (also see page 14, line 20). On page 12, line 22, "leave" should be "leaves".

Appropriate correction is required.

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1-9 and 16-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 is indefinite. Specifically, claim 1 defines the semiconductor surface as an intended metal trench pattern in a dielectric layer, wherein claim 7 states that the semiconductor surface is a substrate material comprising any one of a silicon substrate, silicon on insulator substrate, silicon on sapphire substrate, glass substrate, ceramic substrate, gallium arsenide substrate and metallized substrate. There is a contradiction here, which renders claim 7 indefinite. Clarification and/or correction is required.

Additionally, the word “predetermined” (claims 1 and 16) renders the claims indefinite.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Gupta et al. (US 6,114,243, dated 9/5/00).

Gupta shows the method as claimed in figures 1-17 and corresponding text, as a method for removal of chemical residues from a surface, the surface having a metal pattern 22/24/26 formed in a dielectric substrate 10/18 by a Chemical Mechanical Polishing (CMP) process (fig. 14), the method comprising: plasma etching the surface to remove a predetermined thickness of the metal material (fig. 15).

8. Claims 16-19 are rejected under 35 U.S.C. 102(e) as being anticipate by Ngo et al. (US 6,818,557, dated 11/16/04, filed 12/12/02).

Ngo shows the method as claimed in figures 1-4 and corresponding text, as a method for removal of chemical residues from a surface, the surface having a metal pattern 13A formed in a dielectric substrate 10 by a Chemical Mechanical Polishing (CMP) process, the method comprising: plasma etching the surface to remove a predetermined thickness of the metal material (column 5, lines 49-62; column 8, lines 25-60).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ngo et al. (US 6,818,557, dated 11/16/04, filed 12/12/02) in view of Padhi et al. (US 2004/0248409, dated 12/9/04, filed 3/30/04, provisional filed 6/3/03), further in view of Gupta et al. (US 6,114,243, dated 9/5/00).

Ngo shows the method substantially as claimed, in figures 1-4 and corresponding text, as: preparing the semiconductor surface 10/12/13 using a chemical mechanical polish (CMP) process (fig. 2), the surface defining an intended metal trench pattern 13A in a dielectric layer 10, the metal residue being located in an unintended scratch at the semiconductor surface (column 4, lines 66-67; column 5, lines 1-20); and exposing the prepared semiconductor surface to a plasma and an inert gas (column 5, lines 34-67; column 6, lines 1-49), the plasma having ions reacting with the metal residue, the surface being exposed to the plasma for a predetermined range of time.

Ngo lacks anticipation only in not teaching that the plasma has ions reacting with the metal residue to form a volatile gas; and the specific claimed chlorine, fluorine, and bromine etchants along with pressures, gas flow rates, and temperatures, depth of the scratch, depth of metal residue and range of time of exposure to the plasma.

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Padhi teaches that plasma etching and fluorine vapors may be used instead of ammonia treatment to clean the substrate after CMP processing [0062]-[0063].

Gupta also teaches a conventional post CMP fluorine or chlorine etch (column 5, lines 10-20) which is "like a CMP over-polish process".

It would have been obvious to one of ordinary skill in the art to have cleaned the substrate, in the process of Ngo, by using a plasma chlorine or fluorine etchant as taught by Padhi and Gupta, with the motivation that since Padhi acknowledges that plasmas and fluorine chemistry may be used interchangeably to clean the substrate, use of the halogen etchants would produce a volatile gas. The specific claimed chlorine, fluorine, and bromine etchants along with pressures, gas flow rates, and temperatures, depth of the scratch, depth of metal residue and range of time of exposure to the plasma are obvious parameters of optimization of the process.

### ***Conclusion***

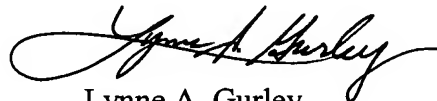
13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See the PTO Form 892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne A. Gurley whose telephone number is 571-272-1670. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lynne A. Gurley  
Primary Patent Examiner  
Art Unit 2812

LAG  
September 29, 2005